69TH CONGRESS } HOUSE OF REPRESENTATIVES { DOCUMENT
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ISLAIS CREEK, SAN FRANCISCO, CALIF.

LETTER

FROM

THE SECRETARY OF WAR

TRANSMITTING

A REPORT FROM THE CHIEF OF ENGINEERS ON PRELIMINARY EXAMINATION AND SURVEY OF ISLAIS CREEK, SAN FRANCISCO, CALIF.

APRIL 21, 1926.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration

WAR DEPARTMENT,
Washington, April 21, 1926.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report, dated the 21st instant, from the Chief of Engineers, United States Army, on preliminary examination and survey of Islais Creek, San Francisco, Calif., authorized by the river and harbor act approved June 5, 1920, together with accompanying papers and map.

Sincerely yours,

DWIGHT F. DAVIS, *Secretary of War.*

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, April 21, 1926.

Subject: Preliminary examination and survey of Islais Creek, San Francisco, Calif.

To: The Secretary of War.

1. I submit for transmission to Congress my report on preliminary examination and survey of Islais Creek, San Francisco, Calif., authorized by the river and harbor act of June 5, 1920, together with accompanying papers and map.

2. Islais Creek is a small tidal stream, not under improvement by the United States, which enters San Francisco Bay from the west, north of Hunters Point. Local interests have rectified and improved the creek and reclaimed some of the adjoining marsh land. A section along the creek is owned by the State of California, which has built terminals and has an additional unit under construction as part of the general water-front facilities of the city of San Francisco. Other adjoining areas are owned by private interests, which desire that they be reclaimed and developed for industrial use. Channelward of the pierhead line in front of the creek is a shoal, extending into San Francisco Bay, which has limiting depths of 34 feet or less over an area of about 300 acres. Request is made that this shoal be dredged to 34 feet and the spoil deposited on neighboring marsh lands.

3. The district engineer states that the water-borne commerce of Islais Creek increased from 98,000 tons in 1921 to 431,000 tons in 1925. The principal items in the latter year were barley, lumber, and petroleum products, handled in foreign, coastwise, and internal trade. He believes that full development of the commercial possibilities of the locality requires dredging channelward of the pierhead line. He proposed to dredge initially a flared channel, designated on the map as "e," to a depth of 34 feet, thus providing an approach to Islais Creek; and at the same time to adopt a project for the removal of the remainder of the shoal, to be carried out when further terminal development along the bay front, which is now being considered, shall be undertaken. The cheapest method of dredging is by sea-going hopper dredge, the material being dumped in deep water in the bay. The use of a hydraulic pipe-line dredge would permit of dumping the material on shore and reclaiming land, but would be considerably more expensive. The district engineer submits a number of estimates for different items, or combination of items, of work, of which the most important are as follows:

Work	Cost by hopper dredge	Cost by hydraulic pipe line	Annual maintenance
Dredging area "e"	$65,000	$168,000	$17,000
Dredging portion of shoal south of area "e"	81,000	232,000	13,000
Removal of entire shoal	186,000	419,000	27,000

4. On account of the local benefits involved, the district engineer believes that the United States should meet half the cost of doing the initial work by the cheaper method, namely, by hopper dredge. Local interests should meet the other half; and if they desire the material pumped ashore for land reclamation, they should also meet the entire additional cost involved in using this method. The first cost to the United States, on this basis, would be $33,000 for the work to be immediately undertaken, and an additional $76,000 for work to be undertaken later.

5. The division engineer concurs in general with this recommendation, except that he believes that the United States should meet the entire first cost of the work on the flared approach channel by the cheapest method, one-half the first cost of the remaining work by the cheapest method, and one-half the cost of maintenance.

6. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith. The board believes that the United States should dredge the flared approach channel as soon as there is assurance that the creek channel will be deepened to 34 feet, and should remove the portion of the shoal south of the flared channel as soon as further developments render this advisable; and that the United States should meet the entire first cost by the cheapest method, and the entire maintenance cost. Local interests, if they desire the material pumped ashore, should contribute the entire additional cost involved.

7. After due consideration of the above-mentioned reports, I concur in the views of the Board of Engineers for Rivers and Harbors. The growing commerce of the port of San Francisco is tending to force an extension of terminal developments to the south. The State of California, foreseeing this need, has expended considerable sums in improving Islais Creek and building terminals thereon. Additional developments are now under way, and still further construction is contemplated, involving a series of piers and slips fronting on the bay near the mouth of the creek. As a result of the work already done, the water-borne traffic of the locality has increased fourfold in the past four years, and now represents a material addition to the general commerce of the port. The provision of a suitable approach channel to Islais Creek by the United States is justified by the magnitude of the commercial interests involved, and there will be a similar justification for dredging the shoal area south of this approach channel when further terminal developments make it appropriate.

No present necessity appears to exist for dredging the portion of the shoal north of the approach channel. The expenditure of the United States should not exceed the sum needed to do the work by the method most economical to the Government, namely, by hopper dredge, and if local interests desire that the more expensive method, involving a hydraulic pipe-line dredge, be used in order that their land may be filled, they should meet the entire excess cost involved. It is understood that the State proposes to dredge the creek to 35 feet, thus providing a satisfactory anchorage at extreme low water for the largest vessels, notably grain ships, which now call or in future may call at the creek. It is probable that a depth somewhat less than 34 feet in the approach channels might prove to be satisfactory, but the saving involved by a slight reduction in depth would be very limited, and in view of the large amount of work done by the locality I consider the proposed depth to be justified. I therefore report that modification of the existing project for San Francisco Harbor, Calif., is deemed desirable so as to provide for the removal to a depth of 34 feet at mean lower low water of that portion of the shoal channelward of the United States pierhead line near the mouth of Islais Creek, including an approach channel "e" as shown on the inclosed map, and the area adjacent to and immediately south of it, at an estimated first cost of $146,000 if done by seagoing hopper dredge, and with estimated annual maintenance of $25,000; provided that no work shall be done on area "e" until the Secretary of War and the Chief of Engineers receive satisfactory assurances that the State will dredge to at least 34 feet the Islais Creek Channel from the United States pierhead line to the vicinity of the existing State terminals;

that no work shall be done on the remainder of the project until such time as, in the opinion of the Secretary of War and the Chief of Engineers, it is rendered necessary by additional terminal developments along the bay front; and that local interests, if they desire the work done by hydraulic pipe-line dredge and the material deposited ashore, shall contribute the entire excess cost involved in dredging by this method above the estimated cost of doing the work with a seagoing hopper dredge, and shall furnish, without cost to the United States, suitable dumping grounds for the dredged material and all necessary levees, bulkheads, drainage canals, sluiceways, or other structures required therefor. The first element of the work undertaken will probably be the deepening of the flared approach channel; the amount of $65,000, which represents the Federal contribution thereto, should be made available in a single appropriation.

H. TAYLOR,
Major General, Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

SYLLABUS

The Board of Engineers for Rivers and Harbors recommends modification of the existing project for San Francisco Harbor, Calif., so as to provide for the removal to a depth of 34 feet at mean lower low water of a portion of the shoal channelward of the pierhead line near the mouth of Islais Creek, at an estimated cost of $146,000, with $25,000 annually for maintenance, subject to certain conditions of local cooperation.

[Third indorsement]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., April 16, 1926.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The following is in review of the reports on preliminary examination and survey of Islais Creek, San Francisco, Calif., authorized by the river and harbor act approved June 5, 1920:

2. Islais Creek is a small tidal estuary entering San Francisco Bay somewhat to the north of Hunters Point. It is not under improvement by the Federal Government. In its natural state it was crooked and shallow and drained an area of marshland. The creek has been rectified and improved and part of the adjoining marshland reclaimed by local interests, all of their work having been performed shoreward of the harbor lines. The depths along the pierhead line at this point are in general 23 feet or more, and between this line and the natural deep channel of San Francisco Bay there is an area of some 300 acres with depths of 34 feet or less. Local interests desire the dredging of this area to 34 feet and the deposit of excavated material on marshy areas in the vicinity of the creek. The range of tide between mean lower low water and mean higher high water is 6.6 feet.

3. The State of California has constructed a grain terminal on Islais Creek just below the Third Street Bridge, and has leased adjacent areas for oil and lumber storage. It is now proceeding

with another terminal unit to the east of the existing one. It plans to dredge the creek to 35 feet at low water shoreward of the pierhead line. Plans have also been prepared for a more extensive improvement by a series of piers and slips fronting on the bay and extending to the pierhead line, but no construction of these has yet started. Various land owners on the north side of the creek, and on the south side upstream from the holdings of the State, have organized a reclamation district, and contemplate filling the area for industrial or other developments.

4. The waterborne commerce of Islais Creek increased from 98,000 tons in 1921 to 431,000 tons in 1925. The principal items in the latter year were 104,000 tons of exported barley, 141,000 tons of inbound coastwise barley and lumber, and 185,000 tons of internal movement, largely inbound barley, lumber and petroleum products carried in barges and other small vessels.

5. The district engineer states that full development of the commerce of the creek requires an approach channel through the bar channelward of the pierhead line of the same depth as that being provided inside; and that additional developments along the bay front would render desirable the removal of the entire bar. He submits estimates for several possible projects and combinations of projects. The principal estimates are as follows:

Dredging to 34 feet of a flared approach channel designated on the sketch map as "e," utilizing a hopper dredge and depositing material in the bay, $65,000, with $17,000 annually for maintenance.

Same, using hydraulic pipe-line dredge and depositing material ashore to reclaimed land, $168,000; maintenance by this method impracticable at reasonable cost.

Removal of that portion of the shoal, south of the proposed flared approach, designated on the map as south extension of "d" and "e," using hopper dredge, $81,000, with $13,000 annually for maintenance.

Same, using pipe-line dredge and depositing material ashore, $232,000; maintenance by this method impracticable at reasonable cost.

Removal of entire shoal, using hopper dredge, $186,000, with $27,000 annually for maintenance.

Same, using pipe-line dredge and depositing material ashore, $419,000; maintenance by this method impracticable at reasonable cost.

6. The district engineer considers that the United States is justified in doing work at present on the flared approach channel, and in adopting a project for removal of the entire shoal, this latter work to be done when it is found necessary for navigation. He feels, however, that local benefits are such that the United States should contribute only one-half the first cost of doing the work by the most economical method, namely, by hopper dredge. Local interests should contribute a sum equal to the other half of the estimated cost by this method; and in addition, if they desire the material pumped ashore to reclaim land, they should contribute the entire excess cost involved in this more expensive method. If such a contribution is made, and if the local interests furnish suitable dumping grounds, the work should be done by pipe-line dredge. Under this arrangement the first cost to the United States would be $33,000 for the work to be immediately undertaken, and an additional $76,000 for the work to be undertaken later. Maintenance should be at Federal expense, using a hopper dredge for the purpose.

7. The division engineer concurs in general with the district engineer, except that he feels that the United States should meet the

entire first cost of the work on the flared approach channel by the cheapest method, one-half the first cost of the remainder, and one-half the cost of all maintenance dredging. He agrees that local interests should be given an opportunity to utilize dredged material for land reclamation provided they meet all additional costs involved.

8. The commerce of Islais Creek in 1925 was 50 per cent greater than in 1924, and over four times that of 1921. Due to the activity of the State in bulkheading, dredging, and in providing deep-water terminals, the creek is becoming an element of considerable importance in the foreign and domestic commerce of San Francisco. Commercial growth of this section is likely to continue, as the increased business of the port will require expansion to the south. There is also a likelihood of industrial development in the neighborhood of the creek. The work now desired is channelward of the harbor lines, and affects the main through navigation channel of South San Francisco Bay, which here follows along the western shore, the central portion of the bay being designated as an anchorage area. The board believes that the interest of the United States in the growth of the commerce of San Francisco Harbor justifies it in meeting the entire first cost of removing, by the most economical method, those portions of the shoal bayward of the pierhead line, which obstruct approach to existing or contemplated terminals, at such times as this work may be found necessary. An approach channel to Islais Creek is desirable as soon as that creek is deepened sufficiently to serve all the present commerce. The flared approach recommended by the district engineer is unusually wide at the entrance, but the tidal currents at this point, the proximity of an anchorage area, and the use of the creek by tows of barges which are difficult to maneuver, make such width desirable. Removal of the portion of the shoal to the south of this will be needed when the proposed terminal developments there are undertaken, and to avoid possible future delay it seems desirable to have authorization given at the present time for the work. The depth proposed by the district engineer, 34 feet, will probably be utilized to the limit by only a very limited number of vessels, and might be somewhat reduced; but the saving would be small, and as the State contemplates dredging to 35 feet to provide safe moorings at extreme low water, a 34-foot approach seems reasonable under the circumstances. No present necessity is seen for adopting the project for removal of the portion of the shoal north of the flared approach channel. It is proper that local interests meet the entire excess cost of depositing dredged material on shore if they desire that this be done. The board does not consider that local cooperation should be demanded in maintenance work.

9. The board therefore recommends that the existing project for San Francisco Harbor, Calif., be modified to provide for the removal, to a depth of 34 feet at mean lower low water, of a portion of the shoal channelward of the pierhead line near the mouth of Islais Creek, including an approach channel "e" as shown on the inclosed map, and the area adjacent to and immediately south of it; at an estimated first cost of $146,000 if done by seagoing hopper dredge, and with estimated annual maintenance of $25,000; provided, that no work shall be done on area "e" until the Secretary of War and the Chief of Engineers receive satisfactory assurances that the State

will dredge to at least 34 feet the Islais Creek Channel from the United States pierhead line to the vicinity of the existing State terminals; that no work shall be done on the remainder of the project until such time as, in the opinion of the Secretary of War and the Chief of Engineers, it is rendered necessary by additional terminal developments along the bay front; and that local interests, if they desire the work done by hydraulic pipe-line dredge and the material deposited ashore, shall contribute the entire excess cost involved in dredging by this method above the estimated cost of doing the work with a seagoing hopper dredge, and furnish, without cost to the United States, suitable dumping grounds for the dredged material and all necessary levees, bulkheads, drainage canals, sluiceways, or other structures required therefor. The first element of the work undertaken should be the deepening of the flared approach channel; the amount of $65,000 which represents the Federal contribution thereto, should be made available in a single appropriation.

10. In compliance with law, the board reports that, except as contemplated by the above recommendations, there are no questions of terminal facilities, water power, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

EDGAR JADWIN,
Brigadier General, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF ISLAIS CREEK, CALIF.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE, FIRST DISTRICT,
San Francisco, Calif., February 2, 1921.

From: The District Engineer.
To: The Chief of Engineers, United States Army.
Subject: Preliminary examination of Islais Creek, Calif.

1. I submit the following report on preliminary examination of Islais Creek, San Francisco, Calif., called for by the river and harbor act of June 5, 1920.

2. The locality was inspected by the district engineer on October 20, 1920. A public hearing, of which a report is herewith,[1] was held at the district office on November 23, 1920. There are also forwarded herewith three maps of the locality marked "A," "B," and "C."[1]

3. *Description.*—Islais Creek is a crooked, shallow, tidal stream, about 2¾ miles long, which flows northeasterly into San Francisco Bay over a wide mud flat lying in the southeastern portion of the city of San Francisco. The area included in its basin is about 425 acres, mostly marshland, surrounded by high ground, except on the bay side. Almost all of this area is covered by high tides, but at low tide the mud flats are above water, where not cut by small

[1] Not printed.

channels and interspersed with shallow pools. Most of the marsh is near the mouth of the creek and lies within the bulkhead line established in 1890. About 350 acres of the marshland and mud flats, lying along the bay water front and inside the bulkhead line, was sold under a State act of 1876 as tide and overflowed land and is now in private ownership. The range of tide between mean lower low water and mean higher high water is about 6 feet. The original shore or high water line of the bay crossed the mouth of Islais Creek just east of Mississippi Street. Thence to the bay was a broad mud flat covered by 1 or 2 feet of water at low tide. This area was laid out in city lots with a view to its reclamation, with proper channel space reserved along the creek.

4. *Previous reports.*—The first report on Islais Creek was submitted by Lieut. Col. George H. Mendell, Corps of Engineers, November 18, 1884, and printed as House Executive Document No. 71, Forty-eighth Congress, second session, and also in the Annual Report of the Chief of Engineers for 1885, page 2340. The report was unfavorable to improvement because the usefulness of the creek for navigation had been practically destroyed by the extension of two streets across the stream, one by a causeway and one by a bridge, and the prospects of commerce were not sufficient to warrant the expense of opening the creek to navigation.

5. A report on the creek was made by Maj. William W. Harts, Corps of Engineers, April 25, 1907, and was printed as House Document No. 77, Sixtieth Congress, first session. This report was unfavorable because the creek was not a part of the navigable waters of the United States, but lay wholly within the established bulkhead line, and because of the high cost of improvement and the lack of any public necessity therefor.

6. *History.*—There has never been a Federal project for the improvement of this waterway. Originally, in 1850, the court held that Islais Creek was navigable, but the State legislature in 1866 and 1868 authorized the construction of a causeway at Third Street, about 4,200 feet back of the present pierhead line. This causeway was built in 1878, and carried two lines of railroad tracks. When the harbor lines for San Francisco were established by the United States in 1890, the pierhead and bulkhead lines were run across the mouth of the creek and it ceased to be considered by the War Department as a navigable channel.

7. A culvert 30 feet wide was built through the causeway mentioned, to carry the creek water and flow of the tides. The causeway was replaced in 1914 by a low single leaf bascule bridge, with a horizontal clearance of 90 feet. Six blocks farther upstream, at Mississippi Street, a distance of about 1,800 feet west of the causeway, is a railroad trestle 2,500 feet long and 30 feet above low water, with bents 15 feet apart. No provision has been made to pass vessels above Mississippi Street, and in addition to this trestle there are several pipe lines which cross here at an elevation a little above high water.

8. It is reported that hay barges and scow schooners formerly used this creek at certain stages of the tide. No other navigation is known to have used this creek prior to the construction of the Third Street causeway. During the existence of the causeway, from 1878 to 1914, there was no commerce on the creek proper. Since the

removal of the causeway in 1914, commerce has grown, and in 1920, was about 94,000 tons. This commerce is carried in sea-going, coasting, and river steamers, barges and gasoline freighters, and consists of oil, lumber, rice and other agricultural products, 17,000 tons being vegetable and fish oils.

9. *Present condition.*—A channel 25 feet deep at low tide and 250 feet wide has been provided by the State, from the bay upstream from the pierhead line to Third Street, thence 18 feet deep and 150 feet wide up to Mississippi Street bridge. Above Mississippi Street, the creek or basin is being reclaimed, and the drainage is carried by a canal about 20 feet wide, passing down the south side of the marsh. All this work entailed the removal of about 600,000 cubic yards of material.

10. *Desires of interested parties.*—The depth of 25 feet to Third Street is not sufficient, it is claimed, because 34 feet is the standard depth along San Francisco wharves, and it is now proposed to make a 34-foot channel in Islais Creek to Third Street. Local interests now ask that the United States dredge to 34 feet below mean lower low water all of the area above the 34-foot contour that lies outside the harbor lines at the mouth of Islais Creek. This area is shown in red on Map B.[1]

11. The Board of State Harbor Commissioners reports that the State has recently acquired 63 blocks of submerged land inclosed by Islais Creek, the bay, India Street, Arthur Avenue, and Third Street, which land is shown on map B.[1] Altogether there is now an area of 280 acres of State-owned land available in this vicinity for development. On the north side of the Islais Creek estuary, there is a large pile boom, and on the south side, a partially reclaimed area retained by a sheet pile bulkhead extending upstream to the oil plant.

12. The Board of State Harbor Commissioners proposes to develop Islais Creek property as a terminal and industrial district. This plan is given on map marked "Exhibit C,"[1] and shows the location of several piers extending to the pierhead line. The dredgings from the channel improvement are to be used to make solid fill structures to the bulkhead line. It was brought out at the public hearing that the improvement of Islais Creek would add valuable wharfage and terminal facilities, and would provide dockage for 49 steamships 500 feet long, and for 6 vessels 300 feet long.

13. *Transfer and terminal facilities.*—The State has recently built an oil terminal on the right bank of the creek, downstream from Third Street, the wharf of which is 760 feet long. Opposite, on the north or left bank, the Shell Co. has a station for gasoline and fuel oil distribution by rail and truck. The oil stock is received by water. Above the Third Street Bridge, the State also has built on the south bank another wharf about 1,600 feet in length, extending almost up to Mississippi Street, near the upper end of which wharf is the Rosenberg Rice Mill. Just downstream from the Mississippi Street trestle, on the left bank, there is the hay and feed plant of Charles E. Gross & Son, which receives its raw materials by boat from this waterway. All of these wharves or plants are connected by rail with the State Belt Railroad. The State oil terminal is modern, and is equipped to store oil in large quantities, either in bulk or small containers, or to discharge direct from vessel to railroad tank cars.

[1] Not printed.

The Shell Co. has large storage tanks, with pipe lines from its wharf, and the rice mill has a mechanical conveyor for carrying the sacks of rice from boat to mill.

14. The Board of State Harbor Commissioners states that there is no present shortage of berths for vessels along San Francisco waterfront, but it believes that additional facilities for shipping and industrial purposes will be needed shortly.

15. *Local cooperation.*—Some property owners state that they will cooperate to the extent of paying for a part of the spoils deposited behind their bulkheads. In this way land would be reclaimed and greatly increased in value. There are no questions of water power or other related subjects to be considered in connection with the work.

16. After the harbor lines were established across Islais Creek, the control of this waterway passed to the State authorities, and the General Government exercised no jurisdiction over it. The creek is now considered private property and its improvement is not considered to be a work that should be undertaken by the United States. The dredging of the area outside the harbor lines is an essential part of the project for development, both to give access to the property and also to furnish material for filling low lands, and should therefore be done by local interests.

17. For the reasons stated, I report that in my opinion Islais Creek, Calif., is not worthy of improvement by the United States.

HERBERT DEAKYNE,
Colonel, Corps of Engineers,
District and Division Engineer.

[Second indorsement]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
April 12, 1921.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. As a result of the district engineer's notice of unfavorable report, a hearing was given at this office on March 29, 1921, which was attended by the Members of Congress concerned, and by the Chief Engineer of the Board of State Harbor Commissioners of the State of California. A stenographic record of the hearing was made to which attention is invited.[1]

2. The waterfront on the San Francisco side of the Bay is owned by the State of California. Jurisdiction is vested in the Board of State Harbor Commissioners who have constructed the existing piers, ferry slips, seawalls, belt railway, etc., and for the purposes of expansion have acquired a large tract of submerged land in the vicinity of Islais Creek, where it proposes to develop a commodious terminal adapted to the use of general commerce, and the development of industries.

3. All work inside the Federal harbor line is to be done by the State at a cost of several millions of dollars, and request is made that the United States cooperate in the improvement to the extent of dredging the shoal outside the harbor line so as to permit access thereto. It was stated at the hearing that the State of California would pay for such dredged material as it could use for filling, and

[1] Not printed.

that perhaps private interests would pay for the filling of some of their adjacent lands.

4. In view of the public character of the proposed improvement, it appears to the board that the United States might properly cooperate by doing the dredging outside the harbor line, deemed necessary to afford access to the proposed State terminal, and particularly if any considerable part of the dredged material is paid for. It is therefore recommended that the district engineer be requested to submit estimates for (*a*) dredging to a depth of 34 feet below mean lower low water the entire shoal outside the Federal harbor lines; (*b*) dredging that part of the shoal that lies outside the proposed State terminal and must be removed so as to permit access to any one of the public piers; (*c*) dredging an adequate approach to the first unit of the proposed State improvement; and that he investigate more fully the question of cooperation.

For the board:

C. KELLER,
Colonel, Corps of Engineers, Resident Member.

SURVEY OF ISLAIS CREEK, CALIF.

SYLLABUS

The district engineer reports that Islais Creek may be improved by dredging at a first cost varying from $130,000 to $410,000 and annual maintenance varying from $20,000 to $40,000; that no plan of cooperation has been agreed upon after long consideration by local interests; that the work is auxiliary to the development of a waterway under local control; and that he does not consider the locality worthy of improvement by the United States.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE, FIRST DISTRICT,
San Francisco, Calif., April 14, 1923.

Subject: Survey of Islais Creek, Calif.
To: The Chief of Engineers, United States Army.

1. I submit the following report on survey of Islais Creek, San Francisco, Calif., in compliance with the river and harbor act approved June 5, 1920.

2. The preliminary examination report on this project submitted February 2, 1921, covered description of the locality, previous reports, history, present condition, general commerce, desires of interested parties, transfer and terminal facilities, and local cooperation. In that report the opinion was expressed that Islais Creek was not worthy of improvement by the United States, as harbor lines were established across its mouth, thereby transferring the control of this waterway to the State and thus making it to all intents and purposes private property over which the Federal Government has no jurisdiction.

3. The survey directed by the Chief of Engineers was completed November 19, 1921, and a map made from information thus obtained accompanies this report as inclosure No. 1.[1] In addition to this, tidal current data on United States Coast and Geodetic Survey Current Chart, inclosure No. 2,[1] and test pile probings made by the Board of State Harbor Commissioners, shown on blue line print, inclosure

[1] Not printed.

No. 3,[1] were studied. This report was prepared largely by George F. Whittemore, assistant engineer, from data compiled by F. C. Scheffauer, assistant engineer, and W. T. Thomas, surveyor.

CHARACTERISTICS

4. The mean tidal range in the vicinity of Islais Creek is 4.8 feet, the range between mean lower low water and mean higher high water is 5.6 feet, and the great tropic range is 7.5 feet. The mean range of spring tides is 6 feet and of neap tides 3.5 feet. As shown on the inclosed copy of United States Coast and Geodetic Survey Current Chart of San Francisco Bay,[1] the prevailing tidal currents in this vicinity flow about parallel to the 3-fathom contour, the flood running southerly and the ebb tide northerly, with a trend for the weaker currents slightly shoreward nearer Hunters Point in the southern part and bayward off Point Potrero north of Islais Creek.

5. The wind diagram on the survey map shows that the offshore winds blow 71 per cent of the time with a prevailing direction from the northwest, west, and southwest and an average velocity of 12 miles per hour; the winds alongshore blow 10 per cent of the time with prevailing directions of north and south and an average velocity of 6.8 miles per hour; the onshore winds blow 19 per cent of the time with prevailing directions of northeast, east, and southeast and an average velocity of 6.1 miles per hour; and that the resultant wind force is from S. 71½° W. There is no record of the fog in the vicinity of Islais Creek.

6. The character of the shoal at the mouth of Islais Creek indicates that it has been deposited from sediment from the adjacent flats and the creek by a reduction in the tidal currents caused by the bight in this vicinity, and that it is formed by the resultant of wind and tidal forces. No signs of rock or any hard material were found by probing in the area surveyed, and from a general study of the Navy Department's borings at Hunters Point, inclosure No. 4,[1] it is thought that rock lies far beneath the plane of any probable improvement. The material of this shoal, bayward of the pierhead line to depths of 35 and 40 feet below mean lower low water, was found to be soft mud of varying consistency, with some shells, very little clay, and a small amount of sand.

7. A comparative study of the shoal above the 36-foot depth, lying within the area adjacent to and bayward of the pierhead line from about 3,400 feet north to 4,400 feet south of the center line of Islais Creek Channel, based on United States Coast and Geodetic Survey charts of 1859 and 1872 and a survey made by this office in 1921, indicates the following approximate changes in volume:

From 1859 to 1872 this area scoured 571,000 cubic yards, distributed as follows: Seventy-four per cent confined to 64 per cent of the total area, between points about 1,700 feet north and 2,200 feet south of the center line of Islais Creek Channel extended bayward; 9 per cent confined to 30 per cent of the total area, the remaining area on the north; and 17 per cent confined to 6 per cent of the total area, the remaining area on the south. In addition to the above, a pothole located about 1,600 feet north and 1,600 feet east of the intersection

[1] Not printed.

of the center line of Islais Creek Channel with the pierhead line, of about 74,000 cubic yards capacity below the 36-foot depth, was filled during the above period.

From 1872 to 1921 the above area scoured about 327,000 cubic yards and shoaled about 24,000 cubic yards, the scour being distributed as follows: 77 per cent confined to 64 per cent of the total area, between points about 1,700 feet north and 2,200 feet south of the center line of Islais Creek channel extended bayward; 23 per cent confined to 6 per cent of the total area, the remaining area on the south. The shoaling was confined principally to the northern part of the area remaining on the north.

From 1859 to 1921, the entire period covered by this comparison, this area scoured about 874,000 cubic yards, distributed as follows: 77 per cent confined to 64 per cent of the total area, between points about 1,700 feet north and 2,200 feet south of the center line of the Islais Creek channel extended bayward, the scour on the southern half of this area being the greater; 3 per cent confined to 30 per cent of the total area, the remaining area on the north; and 20 per cent confined to 6 per cent of the area, the remaining area on the south.

PRESENT CONDITIONS

8. The condition of Islais Creek proper is covered in the preliminary examination report of February 2, 1921. There has been no improvement made of the shoal bayward of the pierhead line except that done by the State in May, 1920, dredging a channel 25 feet deep and 250 feet wide up the creek, which channel has now been filled from natural causes. Shoreward of the pierhead line to Third Street the existing channel provided by the board of State harbor commissioners is 4,120 feet long, 250 feet wide, and has an average depth of 21.9 feet, with a least depth of 18.6 feet. Bayward of the pierhead line that part of the shoal lying above the 34-foot contour has an average depth of 28.2 feet, a least depth of 23.9 feet, is 9,600 feet in length and from zero to 1,800 feet wide, with 6,600 feet of its length south of Islais Creek and 3,000 feet north of it. The greater width and area of this shoal lies to the north of the creek.

9. On January 8, 1923, the Secretary of War approved a modification of the pierhead lines of San Francisco Harbor between points "N" and "U". This modification was made upon application of local interests with a view to permitting certain improvements north of Islais Creek in the vicinity of Mission Rock, and has little or no effect in the vicinity of Islais Creek. The modified line is shown on the survey map accompanying this report.[1]

10. The existing bulkheads in the vicinity of Islais Creek are as follows: A stone retaining wall at the northwest corner of Louisiana and Twenty-fourth Streets extends a short distance along each street; a timber bulkhead of light construction which appears to have been built in connection with street improvement work extends for about 450 feet along the east line of Illinois Street in the vicinity of its intersection with Marin Street; a rubble stone bulkhead of substantial construction extends easterly from the east line of Third Street along the south bank of Islais Creek the entire length of the existing wharf, at which point it connects with an old timber bulkhead which extends in a southerly direction for about 750 feet, thence in a northwesterly

[1] Not printed.

direction and parallel to Arthur Street, a distance of approximately 575 feet to the mainland; a rubble stone bulkhead extends westerly from the west line of Third Street along the south bank of Islais Creek approximately 1,650 feet, or the length of the existing wharf. This bulkhead, however, is not as well constructed as the one on the east side of Third Street, nor has it proved as satisfactory. These structures are shown on Inclosure No. 1,[1] but do not offer any facilities for the deposit of dredged materials.

COMMERCE

11. The commerce of San Francisco Harbor and of Islais Creek for the past five calendar years is reported as follows:

Year	San Francisco Harbor		Islais Creek	
	Short tons	Value	Short tons	Value
1917	9,294,366	$650,912,754	91,786	$4,589,300
1918	6,042,543	507,551,512	49,580	2,479,000
1919	7,113,067	523,493,134	63,640	3,182,000
1920	7,685,402	775,014,544	94,157	5,207,082
1921	8,382,723	765,028,314	98,125	6,314,432

The details of the commerce for Islais Creek for the calendar year 1921 are given below:

Commodities	Short tons	Value
Inbound:		
Rice	8,805	$440,298
Lumber	2,855	57,100
Piles	2,340	35,100
Hay	8,685	147,465
Vegetable oils	8,142	2,035,500
Fuel oil	26,717	267,170
Gasoline	8,881	630,551
Other petroleum products	759	18,003
Unclassified	20,873	2,087,300
Total	88,057	5,718,487
Outbound:		
Hay	5,396	128,745
Unclassified	4,672	467,200
Total	10,068	595,945
Total inbound and outbound	98,125	6,314,432

Vessel classification

	Trips	Total tonnage
Foreign:		
100 to 1,000 tons	1	794
Over 1,000 tons	15	31,091
American:		
Under 100 tons	453	42,277
100 to 1,000 tons	201	69,921
Over 1,000 tons	18	40,661

[1] Not printed.

The largest vessel using this channel had a loaded draft of 27 feet, a net tonnage of 3,586 tons, and a length of 385 feet, and another vessel drew 24 feet with a net tonnage of 4,518 tons.

12. As to prospective commerce that may use this improvement, Mr. Frank G. White, chief engineer of the Board of State Harbor Commissioners, reported on April 4, 1923, that recently two industries which will receive lumber by water have located adjacent to Islais Creek, one other owns property in the vicinity and expects to start work in the near future, and a fourth is now negotiating for a piece of property on which to locate a lumber yard and planing mill. On State property near the oil plant the construction of a grain handling and cleaning plant has been started for handling export barley, now amounting to about 200,000 tons a year; and it is expected by interested parties that this amount of grain will be increased and all handled through this plant during the coming year.

DESIRES OF INTERESTED PARTIES

13. As reported in connection with the preliminary examination, interested parties stated that the present 25-foot channel to Third Street was not sufficient because 34 feet is the standard depth along the San Francisco wharves, and it was requested that a 34-foot channel be dredged across the shoal bayward of the pierhead line and up Islais Creek to Third Street. At the hearing held in San Francisco November 23, 1920, the concerns doing business along Islais Creek above Third Street expressed a desire that a deeper channel be provided as far as the present head of navigation at foot of Mississippi Street. The preliminary examination report being unfavorable, the desires of local interests were afterwards confined solely to the request of the State Board of Harbor Commissioners which controls and operates this port, that the United States dredge to 34 feet below mean lower low water all of that area above the 34-foot contour that lies bayward of the pierhead line at the mouth of the creek. In paragraph 4 of second indorsement on the report on preliminary examination the Board of Engineers recommended that the district engineer be requested to submit the following estimates:

(*a*) Dredging to a depth of 34 feet below mean lower low water the entire shoal outside the Federal harbor lines.

(*b*) Dredging that part of the shoal that lies outside the proposed State terminal and must be removed so as to permit access to any one of the public piers.

(*c*) Dredging an adequate approach to the first unit of the proposed State improvement.

And that he investigate more fully the question of cooperation.

LOCAL COOPERATION

14. Much study has been given to the question of local cooperation by the Board of State Harbor Commissioners, the chamber of commerce, and numerous private interests that have real-estate holdings in the locality. The submission of this report has been delayed for over a year in order that these interests might agree on a plan of local cooperation, but no agreement has been reached whereby the cost to the United States of the proposed work could be reduced by the use of dredged material for reclamation purposes. The Board of State Harbor Commissioners now reports that the area comprising

the first unit nearest the creek is needed to retain its own dredged material, and that it can not pay the cost of impounding elsewhere any material to be dredged by the United States, because no funds are available. There appears to be no prospect of securing within any reasonable time a plan upon which all interests can agree for the development of this project.

COST OF IMPROVEMENT

15. From information obtained by the survey, the following estimates recommended by the Board of Engineers and called for by the Chief of Engineers were prepared:

(*a*) Dredging to a depth of 34 feet below mean lower low water the entire shoal outside the Federal harbor lines, 3,100,000 cubic yards at 12 cents per cubic yard	$372,000
Surveys, office expenses, and contingencies	38,000
Total	410,000
Annual maintenance	40,000
(*b*) Dredging that part of the shoal that lies outside the proposed State terminal and must be removed so as to permit access to any one of the public piers, 1,350,000 cubic yards, at 15 cents per cubic yard	202,500
Surveys, office expenses, and contingencies	22,500
Total	225,000
Annual maintenance	30,000
(*c*) Dredging an adequate approach to the first unit of the proposed State improvement, 1,700,000 cubic yards, at 15 cents per cubic yard	255,000
Surveys, office expenses, and contingencies	30,000
Total	285,000
Annual maintenance	35,000

The following estimates have been made as alternates to the above estimates:

(*a'*) Dredging to a depth of 34 feet below mean lower low water, a channel 800 feet wide, about parallel and adjacent to, and bayward of the pierhead line, 2,100,000 cubic yards, at 13 cents per cubic yard	$273,000
Surveys, office expenses, and contingencies	27,000
Total	300,000
Annual maintenance	35,000
(*b'*) Dredging that part of the shoal that lies outside of the proposed State terminal and must be removed so as to permit access to any one of the public piers, a channel of uniform width with no flare bayward as in item (*b*), 650,000 cubic yards, at 18 cents per cubic yard	117,000
Surveys, office expenses, and contingencies	13,000
Total	130,000
Annual maintenance	20,000

(*c'*) Dredging an adequate approach to the first unit of the proposed State improvement, a channel of uniform width with no flare bayward as in item (*c*), 950,000 cubic yards, at 17 cents per cubic yard	$161,500
Surveys, office expenses, and contingencies	18,500
Total	180,000
Annual maintenance	25,000

In making the above estimates 1 foot was allowed for overdepth. It will be noted that the maintenance costs of projects under propositions (*b*) and (*c*), (*a'*), (*b'*), and (*c'*), in each of which a part of the shoal is removed, are proportionately greater than that under proposition (*a*), wherein all of the shoal is removed. See Inclosure 1[1] for layout of the various proposed channels.

The material to be dredged, as stated hereinbefore, is soft mud of varying consistency, with some shells, little clay, and a small amount of sand.

The above work would be done by contract as the only dredge owned and operated by this district is the *San Pablo*, a seagoing hopper dredge, which is fully occupied on other very important work and is not so well suited for work of this nature as a hydraulic pipe-line dredge.

The unit costs of dredging are based on similar contract work performed in this district.

CONCLUSIONS AND RECOMMENDATION

16. As the control of this waterway rests with the State, no work landward of the pierhead line has been considered in this report.

The cost to the United States to do the work, under the three propositions of the Board of Engineers, may be summarized as follows:

(*a*) $410,000; annual maintenance, $40,000.
(*b*) $225,000; annual maintenance, $30,000.
(*c*) $285,000; annual maintenance, $35,000.

Alternates to the above estimates are given below:

(*a'*) $300,000; annual maintenance, $35,000.
(*b'*) $130,000; annual maintenance, $20,000.
(*c'*) $180,000; annual maintenance, $25,000.

To complete the work under (*a*) would require 1 year and 2 months time, (*b*) 8 months, (*c*) 10 months, (*a'*) 11 months, (*b'*) 4 months, and (*c'*) 6 months. The estimated cost of maintenance is difficult to determine, but the costs as given above will be reduced, it is thought, in proportion to the amount of reclamation work done along the shore adjacent to the improvement.

17. The commerce to be benefited by this improvement, both present and prospective, does not seem sufficient to justify the removal at this time of the entire shoal bayward of the pierhead line. To do this work would involve a departure from the present policy of providing channels of approach only and leaving to local interests the matter of providing the necessary depths to and along the docks

[1] Not printed.

and piers. As no active steps have yet been taken by the State to construct any of the piers and no definite plans of cooperation have been agreed upon, the dredging of that part of the shoal that lies outside the proposed State terminal, so as to permit access to any one of the proposed public piers, does not seem warranted, nor does it seem warranted to dredge an approach to the proposed first unit of the State improvement. The practice in San Francisco Harbor is for the Board of State Harbor Commissioners to dredge shoals near pierhead lines and thence channelward, and I can not, in this case, see any reason to recommend at this time the assumption of this work by the United States.

18. As stated in the preliminary examination report, when harbor lines were established across Islais Creek the control of this waterway passed to State authorities and the Federal Government exercised no jurisdiction over it. The creek is now considered private property and its improvement is not considered to be a work that should be undertaken by the United States. The dredging of the area outside the harbor lines is an essential part of the project for development, not only to give access to the property but to furnish material for reclamation purposes, and it is thought that the work should therefore be done by local interests.

19. After due investigation and consideration, I report that in my opinion Islais Creek, Calif., is not worthy of improvement by the United States at the present time.

HERBERT DEAKYNE,
Colonel, Corps of Engineers,
District and Division Engineer.

SUPPLEMENTARY REPORT ON SURVEY OF ISLAIS CREEK, CALIF.

SYLLABUS

The district engineer recommends the dredging of a flared channel 34 feet deep at mean lower low water across Islais Creek Shoal in approximate prolongation of the axis of Islais Creek Channel, with overdepth dredging of 1 foot, at an estimated cost of $167,580 for new work, of which amount the United States should provide an estimated amount of $32,585 and local interests the balance, because of special local benefits to be derived, and annual maintenance at an estimated cost of $17,000, to be done by the United States, using seagoing hopper dredge, dumping the material in deep water.

The district engineer further recommends that a project be adopted at this time which would include, in addition to the flared channel recommended above, the eventual removal to the same depth of the remaining parts of the Islais Creek Shoal lying bayward of the pierhead line when justified in the interests of navigation, contingent upon local cooperation as stated in the report (par. 43), at an estimated total cost of $591,290 for new work, including the estimated cost for the flared channel above, of which total an estimated total amount of $108,500 should be provided by the United States and the remainder by local interests, with annual maintenance at a total estimated cost of $27,000, to be done by the United States, using seagoing hopper dredge, dumping the material in deep water.

The district engineer further recommends that the above work be included as a part of the project for the harbor at San Francisco, Calif.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE, FIRST DISTRICT,
San Francisco, Calif., March 30, 1926.

Subject: Supplementary report on survey of Islais Creek, Calif.
To: The Chief of Engineers, United States Army
(Through the Division Engineer).

I. GENERAL

1. In accordance with instructions contained in letter, Office Chief of Engineers, dated January 6, 1926,[1] the following supplementary survey report on Islais Creek, Calif., is submitted. The instructions contained in that letter were that a new study of the case should be made and that the supplementary report should cover in detail the present desires of interested parties and the economic justification for the improvement, in whole or in part, at the expense of the Federal Government.

2. The survey report was submitted April 14, 1923. This supplementary report furnishes the requested new data and brings up to date all essential features of the survey report that have changed since its submission. Harbor lines are established across the mouth of Islais Creek, and neither the Board of State Harbor Commissioners nor other interests now request improvement of Islais Creek landward of the pierhead line, confining their desires to the removal of the shoal off the mouth of Islais Creek and bayward of the pierhead line. The improvements discussed in this supplementary report therefore cover only the removal of said shoal in whole or in part. A supplemental map, file 1–1–42, is submitted, on which have been shown the physical changes made and the improvements discussed in this report. All depths and elevations, unless otherwise specified, refer to the plane of mean lower low water.

II. PRESENT CONDITION

3. Since the survey report was submitted, no material change is thought to have taken place on Islais Creek Shoal bayward of the pierhead line. (See par. 26.) That part of the shoal which is above the 34-foot contour has an average depth of 28.2 feet, a least depth of 23.9 feet, is 10,000 feet long, and from zero to 2,100 feet wide, with 5,200 feet of its length lying north of the prolongation of the center line of Islais Creek Channel, and 4,800 feet lying south of it. The greater width and area of this shoal are to the north of said line. Landward of the pierhead line, the existing Islais Creek Channel, maintained by the Board of State Harbor Commissioners, has a present controlling depth of 25 feet from the pierhead line to the bascule bridge at Third Street, a distance of 4,100 feet. Work is now in progress by the State Harbor Commission to dredge this part of the channel to a depth of 35 feet in order to permit the docking of larger-sized vessels. From Third Street to the end of the turning basin, a distance of 1,750 feet, Islais Creek Channel has a depth of 20 feet. These depths are shown on the supplemental map submitted with this report.

[1] Not printed.

III. DEVELOPMENTS EFFECTED BY LOCAL INTERESTS

4. Since submission of the survey report, the following progress toward development of this project has been made by local interests:

(*a*) *Board of State Harbor Commissioners.*—The Board of State Harbor Commissioners has completed the construction of a grain-cleaning and shipping plant for handling export barley and large amounts are regularly shipped from this terminal. It has reclaimed additional land and has leased some of it for fuel-oil depots and for lumber handling and planing mill concerns handling their products by water. It is now proceeding with the construction of the next unit of the State project extending along the southerly side of the Islais Creek Channel to the east, or bayward of the present reclaimed land. This unit consists of a solid fill pier with rock levees on the exposed sides. The unit is to have a wharf for deep-draft vessels on the Islais Creek Channel side and probably wharves for barges on the easterly and southerly faces. The board contemplates dredging and maintaining Islais Creek Channel from the pierhead line landward to Third Street, 300 feet wide and 35 feet deep, to provide adequate access for deep-draft vessels to the present grain and fuel-oil terminals and to the wharf of the new unit under construction. The material obtained from dredging the channel will be utilized to fill the above unit. The board contemplates dredging and maintaining a depth of 25 feet in Islais Creek Channel west, or upstream, of the Third Street bascule bridge to the end of the turning basin, with a possibility that greater depths will be provided in the northerly part of the channel and turning basin to provide for access of deep-draft vessels to a future development proposed there.

(*b*) *Islais Creek Reclamation District.*—The Islais Creek Reclamation District, an official reclamation district, has been created and authorized by the Legislature of the State of California (Stats. Cal. 1925, p. 87, ch. 41). This reclamation district came into existence by virtue of the statute cited on July 24, 1925, and is empowered under the laws of California to reclaim certain lands lying about Islais Creek by constructing embankments and by providing for the fill of the lands behind the embankment. A friendly test case to determine the legality of the authorization of the reclamation district has been decided favorably by the State superior court and is now before the Supreme Court of California. A favorable decision in the matter is expected from this latter court in about two months' time.

(*c*) *City and county of San Francisco.*—The city and county of San Francisco is actively connected with the Islais Creek Reclamation District, and the progress of the city in its development of the project is largely combined with the progress of the reclamation district. In addition, however, to the reclamation feature, the city and county of San Francisco has already appropriated money for three major highway projects leading to the Islais Creek area. These highways are the San Francisco Bay Shore Boulevard, 125 feet in width, which penetrates the westerly end of the district and will eventually lead south to all peninsula points as far as San Mateo; the Ocean Shore or Alemany Boulevard, 100 feet in width, which will lead from the bulkhead line at Islais Creek Channel, penetrate the reclaimed area and lead westerly and southerly to the San Mateo County line, giving service to another section of San Francisco and the peninsula to the

south; and the heavy-traffic roadway on Howard Street, connecting via the Army Street extension with the Alemany Boulevard above. This latter highway will provide direct access for vehicular traffic from the Islais Creek district to the retail district of the city.

(*d*) *Western Pacific Railroad Co.*—The Western Pacific Railroad has made no progress toward development of this project since the submission of the survey report, aside from its membership interest in the Islais Creek Reclamation District. This company states that it owns altogether 95 acres of marsh or submerged land in the Islais Creek district, 33 acres of which are within the Islais Creek reclamation district and 62 acres bayward of said 33-acre tract, reaching to and beyond the bulkhead line of San Francisco Bay. The railroad company states that it has no definite plans regarding the development of the 62-acre tract, but believes that at the proper time it will be developed as a rail and water terminal, with alternate piers and slip basins extending shoreward from the bulkhead line.

IV. COMMERCE

5. The commerce of San Francisco Harbor and of Islais Creek for the past few calendar years is reported as follows:

Year	San Francisco Harbor		Islais Creek	
	Short tons	Value	Short tons	Value
1921	[1] 8,382,723	$765,028,314	98,125	$6,314,432
1922	[1] 14,837,609	1,169,312,045	149,362	[2]
1923	[1] 13,641,884	1,697,788,993	211,523	[2]
1924	[1] 11,395,012	1,246,496,287	282,110	[2]
1925			431,406	11,979,694

[1] Exclusive of general ferry and car-ferry traffic.
[2] No segregation of commodities made and values not obtainable elsewhere.

6. The details of the commerce for Islais Creek for the calendar year 1925 are given below:

Commodities	Tons	Value
FOREIGN		
Imports, rice	1,269	$109,134
Exports, barley	103,782	3,321,024
Total	105,051	3,430,158
DOMESTIC		
Inbound, internal: [1]		
Barley	15,609	499,488
Hay	7,600	152,000
Rice	9,731	836,866
Lumber	53,229	958,122
Petroleum products	97,595	2,962,008
Salt	1,300	9,100
Total	185,064	5,417,584
Inbound, coastwise: [2]		
Barley	42,051	1,345,632
Lumber	99,240	1,786,320
Total	141,291	3,131,952
Total inbound, internal and coastwise	326,355	8,549,536
Grand total, foreign and domestic	431,406	11,979,694

[1] No outbound internal reported.
[2] No outbound coastwise reported.

7, Vessel classification, 1925.

	Trips	Total net registered tonnage
Inbound:		
Steamers	36	132,391
Motor ships	1	2,795
Total	37	135,186
Outbound:		
Steamers	36	132,391
Motor ships	1	2,795
Total	37	135,186
Total inbound and outbound	74	270,372

8. Trips and drafts of vessels, 1925:

	Inbound		Outbound [1]			Inbound		Outbound [1]	
	Steamers	Motor ships	Steamers	Motor ships		Steamers	Motor ships	Steamers	Motor ships
Over 30 feet [1]			3		20 to 22 feet	2		2	
28 to 30 feet [1]	14		11		18 to 20 feet	2		2	
26 to 28 feet [1]	5		5		14 to 16 feet	1		1	
24 to 26 feet	11	1	11	1					
22 to 24 feet	1		1		Total	36	1	36	1

[1] Complete record of the drafts of vessels using Islais Creek Channel are not available for outgoing vessels. Owing to lack of definite information on this matter, the drafts of the outgoing vessels are shown above with the same draft as when incoming, with the exception of three drawing over 30 feet, the drafts of which were available. Vessels of over 25-foot draft using Islais Creek are practically all engaged in the grain trade. These steamers usually complete their full cargo capacity by loading with grain, which carries a very low freight rate. For this reason a large percentage of the larger vessels entering the channel with drafts of 26 to 28 feet leave it with drafts close to 30 feet, although as mentioned above, complete records are not available.

In addition to the above, a large number of smaller ships and barges use this waterway, of which there is no record.

9. A comparison of the commerce of Islais Creek Channel reported for the year 1925, with similar statistics of previous years, shows that there is a rapid and steady growth of commerce in this waterway. While exact data are not available as to the drafts of vessels using Islais Creek Channel prior to 1925, the data available for that year indicate that a large part of the commerce of this channel is moved in deep-draft vessels. The additional Islais Creek terminal facilities now under construction, as well as those contemplated in future development of the Islais Creek-India Basin District, both by the State of California and private interests, are all planned for deep-sea traffic. It may therefore reasonably be expected that the deep-sea commerce passing over the shoal outside of the entrance to Islais Creek Channel and the adjacent waterfront will materially increase in the future.

V. PRESENT DESIRES OF LOCAL INTERESTS

10. The improvements desired by local interests, as expressed in letters submitted in response to a notice from this office requesting additional data for the supplementary report, are as follows:

(*a*) *Board of State Harbor Commissioners.*—The Board of State Harbor Commissioners, in a letter dated January 26, 1926, and accompanied by photostat plans, inclosure 2,[1] desires the removal of the shoal to a depth of 34 feet, bayward of the pierhead line in order to give access to Islais Creek Channel and its present and prospective terminals. The State authorities do not desire that any of the material that may be dredged from the shoal be deposited on State property, because the improvements which the State Harbor Commission has under way and in contemplation consist of solid piers, which for economical prosecution of the work, it is proposed to fill with material obtained by dredging the channels and slips required for these piers.

(*b*) *Islais Creek Reclamation District.*—The Islais Creek reclamation district, in letters dated January 30, 1926, and March 1, 1926, inclosures 3 [1] and 4,[1] desires the removal of the shoal which lies bayward of the mouth of Islais Creek, preferably as a whole, and the deposit of the material dredged therefrom on its lands, in order to make them suitable for industrial sites, which are scarce along the San Francisco waterfront.

(*c*) *City and county of San Francisco.*—The city and county of San Francisco, in a report by the city engineer, dated January 30, 1926, accompanied by plans and photograph, inclosure 5,[1] desires the removal of the entire shoal at the mouth of Islais Creek Channel and the deposit of the material therefrom on the low lands in the reclamation district, for the development of needed industrial sites.

(*d*) *Western Pacific Railroad Co.*—The Western Pacific Railroad Co., in a letter dated January 29, 1926, inclosure 6,[1] desires the removal of the shoal bayward of the mouth of Islais Creek for the improvement of navigation to and from Islais Creek Channel and the bay water front adjacent thereto. It is the owner of the largest amount of land (33 acres) in the Islais Creek Reclamation district, and as a member of the district desires the deposit of the dredged material on this land. The Western Pacific Railroad Co. is also the owner of an additional 62 acres of marsh and submerged land on Islais Creek, lying eastward of its 33-acre holding in the reclamation district and reaching to and beyond the bulkhead line, which land is held with a view to providing future rail to water transfer and terminal development (see also par. 32 hereafter), in cooperation with the Board of State Harbor Commissioners.

(*e*) In addition to the above letters and report, the following letters [1] were received from commercial and shipping interests, all recommending the removal of the shoal off the mouth of Islais Creek Channel:

	Inclosure
San Francisco Chamber of Commerce, Jan. 27, 1926	7
Down Town Association, Feb. 1, 1926	8
Pacific American Steamship Association, Feb. 3, 1926	9
Shipowners' Association of the Pacific Coast, Feb. 4, 1926	10

[1] Not printed.

VI. TRANSFER AND TERMINAL FACILITIES

11. In view of the importance of the matter, the present condition of the transfer and terminal facilities, in addition to the changes or additions that have been made since submission of the survey report, are given below:

12. The existing terminal facilities along Islais Creek Channel are practically all State-owned and controlled. The State has recently reconstructed and extended the facilities used for a grain terminal and has created a fuel-oil terminal on the south bank of the channel, bayward of the Third Street bascule bridge. The former vegetable-oil terminal has been changed to form part of said fuel-oil terminal. The wharf of these terminals is 1,291 feet long. The fuel-oil terminal is leased to two large oil companies which handle their products by water. The grain terminal is used by private concerns for the cleaning and handling of grain, principally barley for foreign shipment. Opposite, on the north, or left bank, the Shell Co. has a station for gasoline and fuel-oil distribution by rail and truck. The fuel oil is received by water. Above the Third Street bascule bridge, the State also has built on the south bank another wharf, about 1,600 feet in length, extending almost up to the Mississippi Street Southern Pacific Railroad trestle, and practically to the end of the channel.

At the upper end of the State wharf is the Rosenberg rice mill. The State wharf is used principally for lumber and rice shipments. just downstream from the Mississippi Street railroad trestle, on the left, or north, bank, is the hay and feed plant of Charles E. Goss & Son, which receives its raw materials by boat from this waterway. All of these wharves or plants are connected by rail with the State Belt Railroad. The fuel-oil terminal is modern and occupies over 3 acres. It includes storage tanks for petroleum and petroleum products, refining works, and equipment for transferring oil between vessels, cars, and tanks. The grain terminal includes more than 3 acres of shed area for handling grain in sacks. It has ample plant for cleaning and grading grain and for transferring it between rail and water carriers. The Shell Co. has large fuel-oil storage tanks with pipe lines between them and the terminal on Islais Creek Channel. The rice mill has a mechanical conveyer for transferring the sacks of rice from boat to mill.

13. As mentioned previously in Section III, paragraph 4a, of this report, the State, since submission of the survey report, has reconstructed and extended the grain terminal and fuel-oil terminal facilities located on the right bank of the creek, downstream from Third Street, and is now engaged in developing the next unit of the industrial terminals project, extending bayward, along the southerly side of the Islais Creek Channel, eastward of the land at present reclaimed. This development is urgently needed to provide increased terminal facilities in this locality, and it is reported that the grain-exporting interests have already requested the board of State harbor commissioners to provide additional grain-handling facilities upon the completion of the improvement now under way.

14. The Board of State Harbor Commissioners contemplates to develop its Islais Creek-India Basin property as commercial and industrial water-front terminals as fast as the facilities are absorbed

and intensive use of them is made. The general plan of this development is as shown on the maps accompanying the letter dated January 26, 1926, from the Board of State Harbor Commissioners, inclosure 2,[1] and is also indicated in outline on the supplemental map prepared by this office, file 1–1–42, inclosure 1, herewith.

15. In this connection the State authorities report that upon the completion of four new piers on the water front of San Francisco, now authorized to be constructed and work on which is to commence soon, the section of the port of San Francisco to the north of the Islais Creek district, up to the United States transport docks, available for commercial shipping, will have been fully utilized. The San Francisco water front westward of the transport docks is not suitable for the development of terminal facilities, because wharves or piers constructed there would be exposed to strong wind and wave action, and the safe docking and mooring of ships would be difficult. The Board of State Harbor Commissioners reports that the logical location for further development in the near future is along Islais Creek Channel and on State property to the south thereof, known as India Basin.

VII. PLANS OF CHANNEL IMPROVEMENT

16. Three modified plans of improvement have been studied in connection with this supplementary report, as follows (see map):

(*d*) To remove a portion of the entire shoal from the pierhead line to deep water, beginning at the northerly end and extending to and just south of the entrance to Islais Creek Channel.

(*e*) To provide a flared entrance channel from deep water to Islais Creek Channel, and in approximate prolongation of Islais Creek Channel, approximately 500 feet wide at the pierhead line and approximately 3,300 feet wide at the 34-foot contour.

(*f*) To provide a channel from the mouth of Islais Creek to deep water north of the shoal, parallel and adjacent to and bayward of the pierhead line, with 800-foot bottom width, but widened at the bend.

17. Consideration has also been given to the removal of the entire shoal at this time, and for channel improvement in extension of plans (*d*), (*e*), and (*f*), at a later date.

18. All of the above dredging to be to a depth of 34 feet, with 1 foot additional for overdepth, as requested by the board of engineers for estimates for the survey report. The above plans of improvement are discussed below. The methods of improvement and costs thereof are described and given in Sections VIII and IX below.

19. *Plan* (*d*).—This plan would provide for unobstructed access to Islais Creek Channel from the north and east. Practically all existing traffic is between Islais Creek Channel and points north thereof. Such an improvement would also provide easy access to the water front landward of the northern part of the shoal, which is, however, not required at the present time. The cost of this plan (see par. 27 hereafter) is the largest of the three modified plans both as regards first cost and maintenance. It is, on the other hand, the best plan from the viewpoint of navigation, because it removes practically all

[1] Not printed.

danger of vessels grounding on the shoal in the foggy weather prevalent in San Francisco Bay, when en route to and from Islais Creek Channel.

20. *Plan* (*e*).—This plan conforms to the usually accepted plan of entrance channel improvement and would be satisfactory for navigation if properly marked. The large area of deep water bayward of it would give ample room for large vessels to make the turn into the entrance channel safely, and, as this channel is in approximate prolongation of the Islais Creek Channel, vessels should have no difficulty in keeping on range when in the channel. It, however, would cause some interference with through traffic in this locality, but that at the present time is very light. The cost of this plan of improvement is the least of those considered as regards first cost, but its maintenance cost will be somewhat greater than for plan (*f*), below.

21. *Plan* (*f*).—This plan would provide access to Islais Creek Channel and also to the water front to the northward of it, which, however, is as yet undeveloped and without definite plans for development. The axis of such a channel would approximately coincide with the currents in this locality, which would reduce its maintenance cost. On the other hand, this entrance channel would be the most difficult to navigate on account of its comparative narrowness and the right-angled turn required into Islais Creek Channel, when taken into consideration with the prevalence of fog in this locality. The first cost of such a channel would be greater than that for channel (*e*), but its maintenance cost would be less.

22. Estimates of cost have also been prepared for channel improvement or shoal removal in extension of plans (*d*), (*e*), and (*f*), with a view toward the ultimate removal of the entire shoal or completion of channel (*f*) to provide navigation facilities for a completed project. Also a revised estimate is submitted for the removal of the entire shoal at one time.

23. Plan (*d*) has no apparent economic justification, so far as the needs of safe navigation are concerned, at the present time. It is believed, however, that economic justification can be had for providing an entrance channel to Islais Creek in the interest of navigation under either plan (*e*) or plan (*f*). Plan (*f*), aside from a lower annual maintenance cost, has no advantage over plan (*e*). On the other hand, it has the disadvantage of being higher in first cost and will be more difficult to navigate by large vessels on account of the shoal lying bayward of the channel to be dredged and on account of the necessity for making a right-angle turn into Islais Creek Channel. Plan (*e*), it is believed, will provide the more direct and satisfactory channel of approach to Islais Creek Channel. It will be the easier to mark and navigate under all conditions of weather, and will amply provide for the movement of the commerce of Islais Creek Channel at the present time. As development of the water front to the north and south of Islais Creek Channel progresses, it will be a simple matter to extend the width of the entrance channel either to the north or south in order to afford access to new terminals, and thus remove the entire shoal in course of time. The cost of maintenance of plan (*e*) improvement, while larger than plan (*f*), due to its position crosswise of the bay currents, will not be great, in view of the fact that the maintenance dredging can readily and

should be done by a seagoing hopper dredge. As the waterfront development progresses and further sections of the shoal are dredged, it is believed that the cost of maintenance will relatively become less due to the elimination of the shore mud flats and the shallower portions of the shoal adjacent to the dredged areas.

VIII. METHODS OF DREDGING

24. The location of Islais Creek Shoal, the character of its material, and the existing depths of water are such that three methods of dredging for the removal of the shoal in whole or in part are practicable and have been studied in connection with this supplementary report, as follows:

(*a*) Dredging by United States seagoing hopper dredge, such as the *Culebra* or *Mackenzie*, depositing the material in deep water of San Francisco Bay.

(*b*) Dredging by pipe-line dredge and depositing the material on shore.

(*c*) Dredging by United States seagoing hopper dredge *San Pablo*, of this district, which is fitted for shore discharge through pipe line, making it possible to deposit the material on shore with the aid, in this particular case, of a booster pump to pump the required distance. It was stated in the survey report that the *San Pablo* was fully occupied on other very important work and was not so well suited for this work as a pipe-line dredge. It now appears, due to the availability of other seagoing hopper dredges, that the *San Pablo* could be made available for the work. In addition, experience gained since submission of the survey report, in pumping ashore with this dredge at Mare Island Strait, indicates that this method could be successfully applied at Islais Creek Shoal. The estimated cost of doing such work with the *San Pablo*, however, closely approximates the cost of doing the work by pipe-line dredge, due to the large amount of expensive shore pipe and booster-plant equipment required for the *San Pablo*. As from present studies no material saving could apparently be effected by using the *San Pablo* to pump ashore, and in view of the fact that a certain percentage of the dredged material vitally needed for reclamation work would be lost overboard in dredging by the *San Pablo*, it is considered that cooperating local interests would prefer to have the work done by a pipe-line dredge. For the above reasons the use of the *San Pablo* to pump ashore is not given further consideration in this report, although it will again be considered when canvassing bids, should a Federal project for improvement be undertaken.

25. The advantages and disadvantages of the first two methods above are stated below:

(*a*) *Dredging by United States seagoing hopper dredge and dumping in deep water.*—The advantage of this method is that it is by far the cheapest method, due to the character of the material to be dredged and the short haul to the dumping ground near Hunters Point. It has the disadvantage that, owing to the operating character of the seagoing hopper dredge when working in silty materials, a portion of the dredged material will flow overboard through the overflow chutes of the dredge, be carried by the ebb-tide currents down along the water front of San Francisco, and may cause a small amount of

silting of the existing slips and basins. Also, from the viewpoint of a general economic policy, it is wasteful to dispose of this material in the above manner in view of its vital need for the reclamation of land to be used for expected industrial and warehouse-site development contiguous to the important harbor developments to be undertaken at this part of the port of San Francisco.

(*b*) *Dredging by pipe-line dredge.*—The advantage of this method is that practically all material dredged will be available for reclamation purposes. Its disadvantage is that it is the most expensive method, particularly so if the work is divided into several units. In addition, it is costly for maintenance work, due to the relatively small yardages involved and the great distance to which the material must be pumped if placed on shore.

IX. COST OF IMPROVEMENT

26. The following estimates of cost have been prepared for the plans of improvement discussed in Section VII, from information obtained for the survey report dated April 14, 1923. It has been assumed that the soundings for the map (not printed) accompanying that report are still materially correct, based on available information and the past history of this shoal.

ESTIMATED COST OF VARIOUS PLANS OF IMPROVEMENT BY DIFFERENT DREDGING METHODS

(NOTE.—All estimates are based on a depth of 34 feet plus 1 foot overdepth and include approximately 15 per cent for administration, engineering, and contingencies:)

(1) *Plan* (*d*).—To remove a portion of the entire shoal from the pierhead line to deep water, beginning at the northerly end of shoal and extending to and just south of the entrance to Islais Creek Channel, as shown on accompanying map, file 1–1–42:

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	1,940,000	$0.065	$126,100	$23,000
Hydraulic pipe-line dredge, deposit ashore	1,940,000	.155	300,700	(1)

[1] Not estimated; impracticable to maintain economically by this method.

(2) *Plan* (*e*).—To provide a flared entrance channel from deep water to Islais Creek Channel in approximate prolongation of the axis of Islais Creek Channel, as shown on accompanying map, file 1–1–42:

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	931,000	$0.07	$65,170	$17,000
Hydraulic pipe-line dredge, deposit ashore	931,000	.18	167,580	(1)

[1] See (1) above.

(3) *Plan (f).*—To provide a channel with 800 feet bottom width, but widened at the bend, from the mouth of Islais Creek Channel, parallel and adjacent to and bayward of the pierhead line, to deep water north of the shoal, as shown on accompanying map 1–1–42.

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	1, 240, 000	$0. 07	$86. 800	$15, 000
Hydraulic pipe-line dredge, deposit ashore	1, 240, 000	. 175	217, 000	(1)

[1] Not estimated; impracticable to maintain economically by this method.

(4) *Extension of plan (d) or (e) southerly to deep water.*—To provide access to the remaining State development to the south of Islais Creek Channel, when needed for navigation due to future terminal development:

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	1, 160, 000	$0. 07	$81, 200	$13, 000
Hydraulic pipe-line dredge, deposit ashore	1, 160, 000	. 20	232, 000	(1)

[1] See (1) above.

(5) *Extension of plan (e) northerly to deep water.*—To provide access to the water front to the northward of Islais Creek Channel, when needed for navigation due to future terminal development:

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	1, 009, 000	$0. 07	$70, 630	$12, 000
Hydraulic pipe-line dredge, deposit ashore	1, 009, 000	. 19	191, 710	(1)

[1] See (1) above.

(6) *Extension of plan (f) southerly to deep water.*—To provide access to the remaining proposed State development to the south of Islais Creek Channel, when needed for navigation due to future terminal development:

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	940, 000	$0. 07	$65, 800	$10, 000
Hydraulic pipe-line dredge, deposit ashore	940, 000	. 20	188, 000	(1)

[1] See (1) above.

(7) *Removal of entire shoal at one time:*

Method of dredging	Cubic yards	Unit cost	Total cost	Annual maintenance cost
United States seagoing hopper dredge, deposit in deep water	3,100,000	$0.06	$186,000	$27,000
Hydraulic pipe-line dredge, deposit ashore	3,100,000	.135	418,500	(1)

[1] Not estimated; impracticable to maintain economically by this method.

27. *Summary of costs.*—The foregoing estimates are briefly summarized as follows:

	First cost		Annual maintenance
	Government dredge	Pipe-line dredge	
Plan (*d*)	$126,100	$300,700	$23,000
Plan (*e*)	65,170	167,580	17,000
Plan (*f*)	86,800	217,000	15,000
Extension of (*d*) or (*e*) southerly	81,200	232,000	13,000
Extension of (*e*) northerly	70,630	191,710	12,000
Extension of (*f*) southerly	65,800	188,000	10,000
Entire shoal at one time	186,000	418,500	27,000

X. LOCAL COOPERATION

(See also paragraphs 40 and 41 hereafter)

28. Local interests, mainly the Islais Creek reclamation district, offer to cooperate with the Federal Government in the removal of the shoal or any part thereof.

29. The board of State harbor commissioners does not desire to obtain any of the reclaimed material and therefore will cooperate only to the extent of providing further terminal development of Islais Creek Channel and adjacent water front to secure full utilization of the Federal work of improvement.

30. The Islais Creek reclamation district offers to cooperate with the United States Government in the cost of removing the shoal, provided the dredged material so removed is used to reclaim the lands of said reclamation district.

31. The city and county of San Francisco offers to cooperate indirectly by providing highways that will further the full utilization of the project.

32. As previously stated in paragraph 10 (*d*) above, the Western Pacific Railroad Co., in addition to its holdings within the territorial limits of the Islais Creek reclamation district, owns 62 acres of marsh or submerged land in the vicinity of Islais Creek outside of reclamation district. The railroad company requests that it be given the option, in event that dredging of the shoal is done, to have deposited on this 62-acre area, upon payment of a unit price fairly proportionate to that which may be established for material dredged from the shoal and deposited on the reclamation district, any portion or all of the excess material from the shoal over and above that which

may be required for the filling of the lands in said reclamation district, provided notice of the exercise of such option is given by the railroad to the district engineer sufficiently in advance of the dredging operations to enable proper arrangements to be made for such disposition of material in specification for the work.

XI. ECONOMIC JUSTIFICATION FOR IMPROVEMENT BY THE UNITED STATES

33. The survey report on Islais Creek, submitted by Col. Herbert Deakyne, Corps of Engineers, then district engineer, on April 14, 1923, was unfavorable to the proposed improvement, substantially on the following grounds: The existing and prospective commerce to be benefited by improvement at that time did not seem sufficient to justify the removal of the entire shoal bayward of the pierhead line; to do the work would involve a departure from the policy of providing channels of approach only, leaving to local interests the matter of providing the necessary depths to and along docks and piers; no active steps had yet been taken by the State to construct any of the piers, and no definite plans of local cooperation had been agreed upon, and, inasmuch as harbor lines had been established across Islais Creek, it was considered that the waterway had become private property and that the dredging of the shoal at its entrance, bayward of the harbor lines, should be considered an essential part of the project for development, not only to give access to the property, but for reclamation purposes, and the work therefore should be done by local interests.

34. There has been no change in the situation so far as affects the needs of through general navigation in San Francisco Bay. The shoal obstructs to a minor degree the through channel along the water front of San Francisco to the south, used by the largest commercial and naval vessels when en route to and from the dry docks at Hunters Point, but this obstruction can not be considered important or as requiring action by the Federal Government. Islais Creek Shoal, however, does form at present an obstruction to free access from deep water to Islais Creek Channel, an important section of the port of San Francisco, and later will become an obstruction to navigation to the adjacent water front, near Islais Creek, as such adjacent water front is developed for terminal use.

35. The question of removing this shoal has been given considerable study in connection with the preliminary examination now being made of the harbor at San Francisco. At the time the survey report on Islais Creek was submitted the commerce was comparatively small and unimportant, the general development of the region not far advanced, and, as indicated in paragraph 14 of the survey report, there did not at that time appear to be any prospect of securing within any reasonable time a plan upon which all interests could agree for the development of the project as a whole, nor any possibility of obtaining any agreement with local interests whereby the cost to the United States of the proposed work could be reduced by the use of dredged material for reclamation purposes. These conditions have now been considerably changed by the large increase in commerce, the organization under State law of a district to carry out the reclamation of adjacent lowlands, the development of terminal

facilities, the offer of local interests to cooperate in the improvement desired, and the fact that the terminal development of the harbor of San Francisco as a whole is rapidly reaching the stage where expansion to the Islais Creek section is apparently the next logical step.

36. Since the survey report was submitted important terminal developments at the Islais Creek section of the port of San Francisco have occurred, and additional development is in progress, as indicated in paragraphs 11 to 15 above. The commerce of Islais Creek Channel has increased from about 98,000 tons in 1921, the last year considered in the survey report, to an amount of about 431,400 tons in 1925. The maximum draft of vessels has increased from 27 feet, the draft of the largest vessel using Islais Creek up to 1921, until in 1925 vessels drawing 28 to 30 feet and more are noted as regularly using this waterway.

37. It is believed that the changed situation, as outlined briefly above, makes it proper to give new consideration at this time to the question as to whether, in view of the general character of the commerce at the Islais Creek section of San Francisco Harbor and of the fact that the present and prospective terminal development of the region is of a public character, being state-owned, it may not be proper for the United States at this time to cooperate by carrying out such improvement outside the pierhead line as is deemed necessary for purposes of navigation, provided an equitable share of the cost, either in the form of payment for dredged material or otherwise, is contributed by local interests.

38. It is considered, in this connection, that Islais Creek Channel is not a minor, isolated waterway but, on the contrary, is an important part of the water front of the port of San Francisco; also, that the proposed development of the water front adjacent to Islais Creek Channel is planned in order to provide the most modern terminal facilities for the deepest-draft vessels using the harbor. For these vessels the Board of State Harbor Commissioners maintains a depth of 34 to 40 feet in the existing docks and along the piers of San Francisco Harber, and it is believed that in the event that Islais Creek Shoal is improved a depth of 34 feet should be provided across the shoal so as to make this improvement consistent with other parts of the port.

The harbor of San Francisco is a port of the first class, for which depths between 30 and 40 feet are generally necessary for present-day ships. A depth of 34 feet does not appear excessive for so important a section of this port. It is believed that this depth of water is economically justified, in that it will prevent costly delays to shipping using Islais Creek Channel. Deep-draft vessels at present must be moved at high-water stages of the tide. With an entrance channel dredged to a depth of 34 feet, the deepest-draft vessels can enter and leave the waterway at any stage of the tide, which in this part of the Bay of San Francisco is often 1 to 1.5 feet below datum.

It may not be amiss to invite attention to the fact that a large vessel, in order to steer well, should not "smell bottom," but should have several feet clear under its keel, and that a deep-draft vessel is often a few feet out of trim, which is usually not corrected until the vessel is in the open bay. Consideration should also be given to the natural deterioration in a dredged channel, and that maintenance work is not always practicable promptly when needed, resulting in a

channel, sometimes for considerable periods, with less than project depth.

The proposed enlargement of the grain-handling and shipping terminals along Islais Creek will no doubt result in increased use of this waterway by deep-draft vessels and consequently more delays than at present may be expected, if improvement is not effected. Wharves with ample approach-channel depths exist along the water front of San Francisco, but to move the existing grain terminals with their special facilities to these locations, instead of improving the Islais Creek Shoal, would be costly and unwarranted and would be impracticable otherwise as all of the existing and proposed water front piers to the northward of Islais Creek Channel are fully utilized at the present time.

39. A consideration of all the facts involved, having reference particularly to the large and rapidly growing commerce of Islais Creek Channel, the deep draft of the vessels engaged in such commerce, and the existing and proposed certain development in this channel for a large deep-sea traffic, seems to furnish economic justification for improvement of Islais Creek Shoal by the United States at this time, contingent upon local cooperation as hereafter discussed, to the extent of providing a channel of access to Islais Creek across Islais Creek Shoal bayward of the established pierhead line. Extension of the improvement to include the remainder of the shoal, bayward of the pierhead line, may be justified in the future as the proposed terminal development and the consequent needs of navigation are extended to the adjacent water front.

40. The interests of the United States, from the standpoint of navigation, justify participation in the proposed improvement of the shoal only to the extent of doing the dredging in the cheapest manner practicable for the needs of navigation; that is by United States seagoing hopper dredge, such as the *Culebra* or *Mackenzie*, dumping the material in nearby deep water. The estimated cost of doing the work in this manner is small, from 6 to 7 cents per cubic yard, place measurement, as given in detail in paragraph 26 above. To do the dredging in conjunction with the reclamation work desired by local interests, with a pipe-line dredge, would cost an estimated amount of from 7½ to 13 cents more per cubic yard place measurement, depending upon the amount of dredging done under one contract. These estimates do not include the cost of levees, dikes, bulkheads, drainage canals, sluiceways or other structures pertaining to impounding dredged material, which should be provided by local interests, but do include the cost of administration, engineering, and contingencies. Any excess cost of the cooperative work, over the cheapest method of improvement for navigation alone, should manifestly be borne by the benefited parties.

41. In addition, however, as the navigation improvement to be effected, besides being of general benefit to the commerce of this portion of the port of San Francisco, would create a decided local benefit to property values in the reclamation district and in the general vicinity of Islais Creek Channel, it is thought that a fair portion of the least cost for which the improvement could be carried out for navigation purposes alone should also be borne by local interests. A proper division of this least cost, considering the bene-

borne by the United States, using seagoing hopper dredge. The total estimated cost for removal of the entire shoal at one time would be $418,500.

45. This work should preferably be done by contract, using a pipe-line dredge; but further consideration should be given to doing the work by the seagoing hopper dredge *San Pablo*, with shore-pipe discharge, when bids are canvassed. It is estimated that six months' time will be required to complete the work under plan (e) with a pipe-line dredge.

46. It is further recommended that the project for the improvement of Islais Creek, if adopted, be included as an item of the project for improvement of the harbor at San Francisco, Calif., in view of the fact that Islais Creek Channel and the adjacent water front to the north and south are parts of the main water front of the port of San Francisco and logically pertain to the improvement of that harbor.

John W. N. Schulz,
Major, Corps of Engineers, District Engineer.

[First indorsement]

Office, Division Engineer, Pacific Division,
San Francisco, Calif., April 9, 1926.

To the Chief of Engineers, United States Army,
Washington, D. C.

1. In the original survey report of April 14, 1923, the opinion was stated, and conclusions and unfavorable recommendations were based thereon, that dredging of a channel by the United States through the shoal off the entrance to Islais Creek would be contrary to the policy that dredging by the United States should be confined to approach channels. The present division engineer is of the opinion that a channel through the shoal, from the bay to the pierhead line, is properly to be classed as an approach channel as it serves to furnish entrance to an important interior waterway, Islais Creek. He recommends that a project be adopted based on such a view.

2. He concurs in the recommendation of the district engineer that the project should contemplate, for first completion, a channel according to plan (e), described in the district engineer's report above, with later removal, if needed, of the rest of the shoal bayward of the pierhead line. He thinks, however, that the United States should meet the entire first cost of the channel according to plan (e), one-half of the first cost of subsequent dredging to remove the rest of the shoal, and one-half of the cost of all maintenance dredging, such cost assumed in whole or in part by the United States to be the actual or estimated cost of doing the work by United States hopper dredge or other cheapest method, including a proper share of overhead, and that other costs, partial and excess, should be borne by local interests. Local interests should be given an opportunity to utilize dredged material for land reclamation, provided they will meet the extra cost of dredging referred to and furnish dumping grounds and accessories.

G. R. Lukesh,
Lieutenant Colonel, Corps of Engineers, Division Engineer.

○

WAR DEPARTMENT.

CORPS OF ENGINEERS, U. S. ARMY.

SAN FRANCISCO BAY IN VICINITY OF ISLAIS CREEK, CALIFORNIA

Scale:- 1" 640'

U.S. Engineer Office, 1st Dist., San Francisco, Calif., March 26, 1926.

Submitted: F. C. Scheffauer, Assistant Engineer

Approved: Glen W. R. Edwards, Major, Corps of Engineers, U.S.A.

Transmitted with supplemental report dated March 30, 1926.

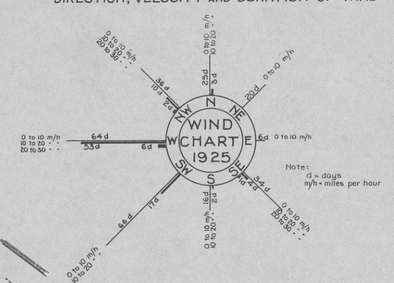
Drawn by: W.T., B.A.D. Checked by: F.C.S.

DOC. FILE	FILE	DIV.	SHEET
F 92/125	1	1	42

House Doc. No. 337, 69th Cong., 1st Sess.

VICINITY MAP

DIRECTION, VELOCITY AND DURATION OF WIND



COMPILED FROM DATA OF U.S. WEATHER BUREAU, SAN FRANCISCO STATION

TABLE OF PROBINGS

MATERIAL	NUMBER																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WATER	28.5	28.8	27.0	26.4	25.8	23.2	23.0	22.8	22.1	24.2	27.6	35.6	26.7	28.4	28.3	28.1	28.5
VERY SOFT SILT	10.5	9.8	9.5	11.0	11.6	13.0	15.1	14.2	13.2	12.5	8.0	4.5	6.5	8.0	8.0	8.0	10.0
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
WATER	26.9	27.6	26.7	26.8	27.2	28.8	29.1	31.8	29.7	34.6	31.3	31.2	30.3	30.3	30.2	31.2	31.8
VERY SOFT SILT	8.0	11.2	9.7	10.8	9.2	11.0	6.6	6.2	5.0	4.0	7.2	7.2	8.0	8.5	7.5	6.5	6.3

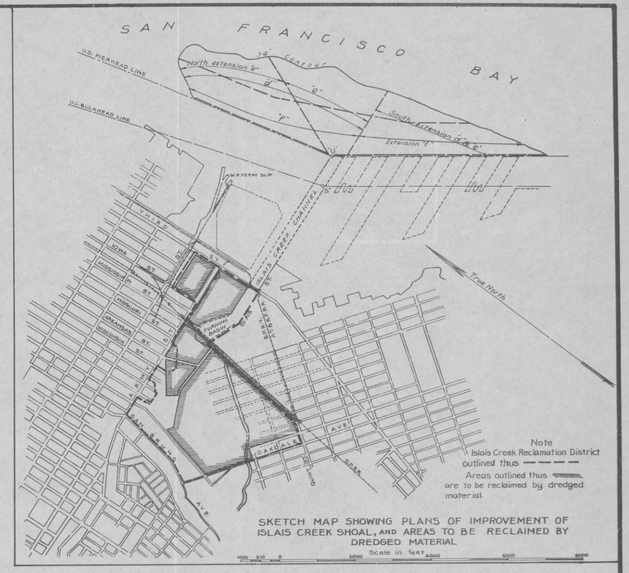
Note:
The table shows the thickness of the different materials in feet, with water referred to the plane of M.L.L.W.
Probings indicated thus:— ◎

TABLE OF EXCAVATION REQUIRED

Note:-All improvements to 34 feet below mean lower low water. (Overdepth 1 foot)

SECTION	MAIN SECTION CU. YDS.	SIDE SLOPES CU. YDS.	OVERDEPTH CU. YDS.	TOTAL CU. YDS.
"d"	1,602,500	3000	334,500	1,940,000
"e"	773,000	5000	147,000	931,000
North extension "e"	821,500		187,500	1,009,000
South extension "e"	1,005,300		154,700	1,160,000
"f"	1,061,600	8400	170,000	1,240,000
Extension "f"	821,500	2000	116,500	940,000
Whole area	2,610,800		489,200	3,100,000

SKETCH MAP SHOWING PLANS OF IMPROVEMENT OF ISLAIS CREEK SHOAL, AND AREAS TO BE RECLAIMED BY DREDGED MATERIAL.



—NOTE—

Soundings, from a U.S.E.D. survey made in Nov. 1921 are in feet and tenths and refer to the Tide Gage on the Western Sugar Refinery Wharf, the zero of which is set to the plane of M.L.L.W. as determined in 1895 by U.S.C. & G.S. observations at Union Iron Works.

Topography and High Water Line obtained from maps on file in the Engineering Dept. of the State Harbor Commissioners, San Francisco, Cal.

B.M. Elev. 11.79 feet above the zero of the U.S.E.D. Tide Gage and same elev above M.L.L.W. at Presidio Wharf, San Francisco, as determined by the U.S.C. & G.S.